CLAIMS

1. A method of estimating the characteristics of a wireless channel comprising:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation;

calculating a phase difference between at least two of the training symbols;

using the calculated phase difference to coherently combine the training symbols to produce a composite training symbol; and

using the composite training symbol to estimate the channel.

2. A method of estimating the characteristics of a wireless channel as recited in claim 1 wherein the plurality of training symbols includes more than two training symbols.

3. A method of estimating the characteristics of a wireless channel as recited in claim 1 wherein the phase difference is calculated by computing the cross correlation of each of the at least two training symbols and computing the self correlation between the cross correlation values of two training symbols.

4. A method of estimating the characteristics of a wireless channel as recited in claim 1 wherein the calculated phase difference is used for fine frequency offset determination.

5. A method of estimating the characteristics of a wireless channel as recited in claim 1 wherein the training symbols are the long symbols defined in the IEEE 802.11a standard.

6. A method of estimating the characteristics of a wireless channel as recited in claim 1 wherein a plurality of phase differences are calculated and the average of the phase differences is used for fine frequency offset determination.

7. A method of classifying a packet sent over a wireless channel comprising:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation;

detecting a phase transition between at least two of the training symbols; and

classifying the packet based on the detected phase transition.

8. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein detecting a phase transition between at least two of the training symbols includes calculating a phase difference between at least two of the training symbols and comparing the calculated phase difference to a threshold.

9. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein detecting a phase transition between at least two of the training symbols includes conjugate multiplying the training symbols and determining the sign of the real part of the result of the conjugate multiplying.

10. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein detecting a phase transition between at least two of the training symbols includes computing the angle of the self correlation of the training symbols.

11. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the classification determines the number of training symbols expected.

12. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the classification determines a data rate for a portion of the packet.

13. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the classification determines the data rate of a field included in the packet that contains information about the data rate for another field in the packet.

14. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the phase difference is caused by inverting the sign of a selected training symbol.

15. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the phase difference is caused by inverting the sign of a selected training symbol and the classification is based on which training symbol was selected to be inverted.

16. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the result of comparing the calculated phase difference to a threshold is used as a confirmation that the packet is a valid packet.

17. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the result of comparing the calculated phase difference to a threshold is used to selectively change the polarity one or more received training symbols.

18. A method of classifying a packet sent over a wireless channel as recited in claim 7 wherein the result of comparing the calculated phase difference to a threshold is used to selectively switch the polarity one or more received training symbols and wherein the calculated phase difference used to coherently combine the training symbols.

19. A method of signaling the classification of a packet sent over a wireless channel comprising:

determining the classification of the packet;

selectively inverting the sign of one or more training symbols according to the classification of the packet; and

transmitting the plurality of training symbols.

20. A method of estimating the characteristics of a wireless channel comprising:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation;

calculating a phase difference between at least two of the training symbols;

using the calculated phase difference to determine a fine frequency offset.

21. A system for estimating the characteristics of a wireless channel comprising:

a receiver configured to receive a plurality of training symbols sent for the purpose of facilitating channel estimation;

a processor configured to:

calculate a phase difference between at least two of the training symbols;

use the calculated phase difference to coherently combine the training symbols to produce a composite training symbol; and

use the composite training symbol to estimate the channel.

22. A system for classifying a packet sent over a wireless channel comprising:

a receiver configured to receive a plurality of training symbols sent for the purpose of facilitating channel estimation;

a processor configured to:

detect a phase transition between at least two of the training symbols; and

classify the packet based on the detected phase transition.

23. A system for encoding a packet classification into a packet sent over a wireless channel comprising:

a transmitter configured to transmit a plurality of training symbols sent for the purpose of facilitating channel estimation;

a processor configured to:

invert the sign of one or more training symbols according to the classification of the packet.

24. A system for estimating the characteristics of a wireless channel comprising:

a receiver configured to receive a plurality of training symbols; and

a processor configured to calculate a phase difference between at least two of the training symbols and to use the calculated phase difference to determine a fine frequency offset.

25. A computer program product for estimating the characteristics of a wireless channel, the computer program product being embodied in a computer readable medium and comprising computer instructions for:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation;

calculating a phase difference between at least two of the training symbols;

using the calculated phase difference to coherently combine the training symbols to produce a composite training symbol; and

using the composite training symbol to estimate the channel.

26. A computer program product for classifying a packet sent over a wireless channel, the computer program product being embodied in a computer readable medium and comprising computer instructions for:

receiving a plurality of training symbols sent for the purpose of facilitating channel estimation;

calculating a phase difference between at least two of the training symbols;

comparing the calculated phase difference to a threshold; and

classifying the packet based on the comparison.